Alg. 2 Warm Up # 4-2

Factor completely:

1. $x^2 - 9$ 2. $4x^2 - 25$ 3. $18x^2 - 32$

4. Solve using the zero product property:

a) $6x^2 - 33x + 27 = 0$ b) $14x^2 - 2x = 0$

HW Questions:

Preview

5-96. Last night, while on patrol, Agent 008 came upon a spaceship! He hid behind a tree and watched a group of little space creatures carry all sorts of equipment out of the ship. But suddenly, he sneezed. The creatures jumped back into their ship and sped off into the night. 008 noticed that they had dropped something, so he went to pick it up. It was a calculator! What a great find. He noticed that it had a LOG button, but he noticed something interesting: log 10 did not equal 1! With this calculator, log 10 ≈ 0.926628408 . He tried some more: log 100 ≈ 1.853256816 and log 1000 ≈ 2.779885224 .

12 a. What base do the space creatures work in? Explain how you can tell.

b. How many fingers do you think the space creatures have?

exp

$\log_{10} 10 = 1$

$b^{1.853256816} = 100$

$\log_b a$ = exponent

5-97. Copy these equations and solve for x. You should be able to do all these problems without a calculator.

a. $\log_x(25) = 1$ → $x^1 = 25$

b. $x = \log_3(9)$ → $3^{1/2} = x$, $x = \sqrt{3}$

c. $3 = \log_7(x)$ → $x^3 = 27$, $x = 3$

d. $\log_3(x) = \frac{1}{2}$

e. $3 = \log_x(27)$

f. $\log_{10}(10000) = x$ → $10^x = 10{,}000$

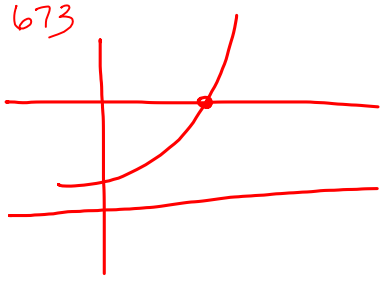
5-98. Is $\log(0.3)$ greater than or less than one? Justify your answer.

Base 10 → $10^? = 0.3$

5-99. Solve $1.04^x = 2$. Your answer should be accurate to three decimal places.

Graph $y = 1.04^x$ and $y = 2$. Find the intersection of the graphs.

$x \approx 17.673$



2nd Calc TRACE

5-100. This problem is a checkpoint for factoring quadratics. It will be referred to as Checkpoint 5B.

Factor each expression below.

a. $4x^2 - 1$ → $(2x-1)(2x+1)$

b. $4x^2 + 4x + 1$

c. $2y^2 + 5y + 2$

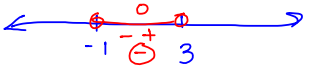
d. $3m^2 - 5m - 2$

5-101. Solve the following inequalities.

a. $x^2 - 2x < 3$

$x^2 - 2x - 3 < 0$

$(x-3)(x+1) < 0$

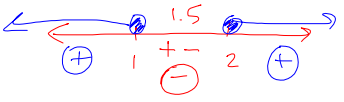


$-1 < x < 3$

b. $3x - x^2 \le 2$

$x^2 - 3x + 2 \ge 0$

$(x-1)(x-2) \ge 0$



$x \le 1$ or $x \ge 2$

5-102. Is it true that $\log_3(2) = \log_2(3)$? Justify your answer.

$x = y$?

Let $x = \log_3 2$

Let $y = \log_2 3$

$3^x = 2$ $\qquad$ $2^y = 3$

$3^0 < 3^x < 3^1$ $\qquad$ $2^1 < 2^y < 2^2$

$1 \quad 2 \quad 3 \qquad 2 \quad 3 \quad 4$

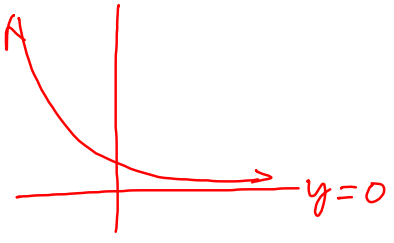
5-103. Consider the general form of an exponential function: $y = ab^x$.

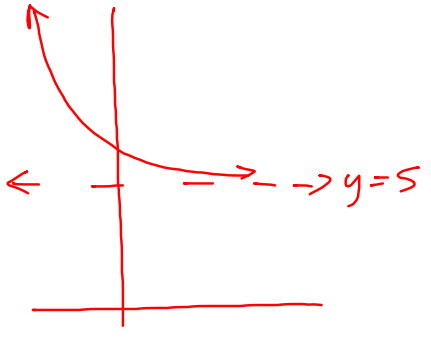
a. Solve for a. $\frac{y}{b^x} = a$

b. Solve for b. $\frac{y}{a} = b^x$

$\sqrt[x]{\frac{y}{a}} = b$

5-104. Make a sketch of a graph that is a decreasing exponential function with the x-axis as the horizontal asymptote. Then make a similar sketch, but this time with the line $y = 5$ as the horizontal asymptote.





Practice with Compositions:

$f(x) = 4x + 5$ $\quad g(x) = (x - 3)^2 + 1$

$f(g(2)) = 4(g(2)) + 5$

$= 4((2-3)^2 + 1) + 5$

$= 4(1 + 1) + 5$

$= 4(2) + 5$

$= \boxed{13}$

$g(f(-3)) = [(f(-3)) - 3]^2 + 1$

$= [(4(-3)+5) - 3]^2 + 1$

$= [(-12+5) - 3]^2 + 1$

$= (-7 - 3)^2 + 1$

$= \boxed{101}$

Practice with Compositions:

$f(x) = 4x + 5$ $\quad g(x) = (x - 3)^2 + 1$

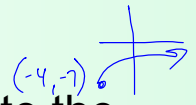
$f(g(x)) = 4((x-3)^2 + 1) + 5$

$= 4(x^2 - 6x + 9 + 1) + 5$

$= 4x^2 - 24x + 45$

Test practice:

Write the inverse equation and state the domain and range for both.



a) $y = (x - 6)^2 + 8$

dom: $x = \mathbb{R}$

range: $y \geq 8$

$y = \pm\sqrt{x - 8} + 6$

dom: $x \geq 8$

range: $y = \mathbb{R}$

b) $y = 2\sqrt{x + 4} - 7$

dom: $x \geq -4$

range: $y \geq -7$

$y = \frac{1}{2}(x+7)^2 - 4$

dom: $x \geq -7$

range: $y \geq -4$

Remember describing transformations:

Parent	General form
$y = x^2$	$y = a(x-h)^2 + k$
$y = \sqrt{x}$	$y = a\sqrt{x-h} + k$
$y = \frac{1}{x}$	$y = \frac{a}{1}\left(\frac{1}{x-h}\right) + k$
	$y = \frac{a}{x-h} + k$

Transformations

h → horizontal translation

k → vertical translation

If a>1, vertical stretch

If 0<a<1, vertical compression

If a<0, reflection in the x-axis

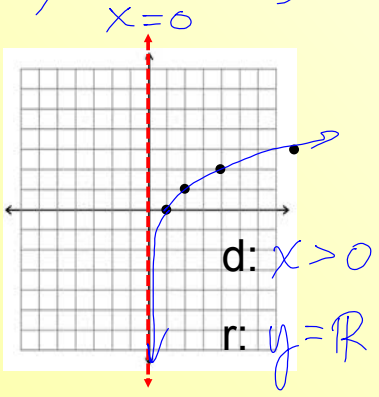
Yesterday's CP's: Yellow, 5.2.4 (revised)

#3 $y = \log_2 x$

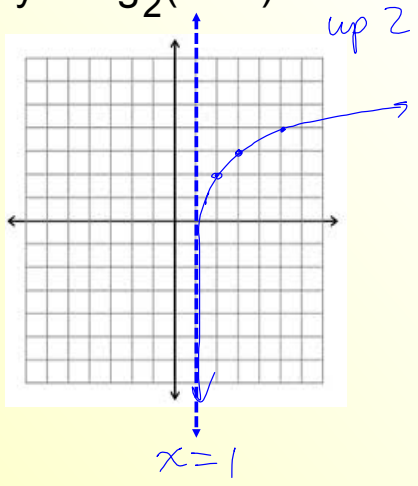
x	y
1	0
2	1
4	2
8	3

$2^y = x$

x	y
2	2
3	3
4	4
9	5



#4 $y = \log_2(x - 1) + 2$



HW: 5 - CI

#126 ---> 134

Chapter 5 test Friday includes:

Absolute Value Inequalities
Quadratic Inequalities
Factoring
Exponents
Inverses
Basic Logarithms